TRAVAUX DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE «GRIGORE ANTIPA»

THE JOURNAL OF "GRIGORE ANTIPA" NATIONAL MUSEUM OF NATURAL HISTORY

Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 64 (2): 115–119 (2021)
doi: 10.3897/travaux.64.e70928

BOOK REVIEW

Peter Shurulinkov, Zdravko Hubenov, Stoyan Beshkov, Georgi Popgeorgiev (Eds) *Biodiversity of the Bulgarian–Romanian section of the Lower Danube* Book review

Alexi Popov[1]

1 *National Museum of Natural History, Bulgarian Academy of Sciences, Tsar Osvoboditel Blvd 1, 1000 Sofia, Bulgaria*

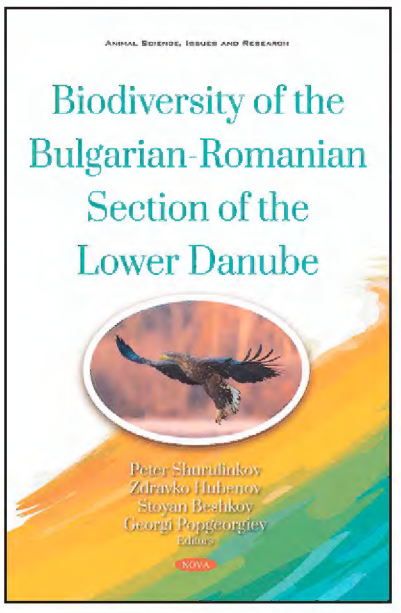
Corresponding author: *Alexi Popov* (alpopov@nmnhs.com)

Received 1 July 2021 | Accepted 11 October 2021 | Published 31 December 2021

Citation: Popov A (2021) Peter Shurulinkov, Zdravko Hubenov, Stoyan Beshkov, Georgi Popgeorgiev (Eds) *Biodiversity of the Bulgarian–Romanian section of the Lower Danube* Book review. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 64(2): 115–119. https://doi.org/10.3897/travaux.64.e70928

Keywords

Bulgaria, conservation significance, important plant areas, insects, mollusks, Romania, species diversity, vertebrates.



Shurulinkov P, Hubenov Z, Beshkov S, Popgeorgiev G (Eds) (2019) Biodiversity of the Bulgarian-Romanian section of the Lower Danube. Nova Science Publishers, New York, xviii + 441 pp.

Copyright *Popov*. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

The Danube River flows across much of the European continent from its central part to its southeastern border. In addition to its high transport, commercial and economic importance, the River is also a key factor in biodiversity, especially in its lower course. Therefore, it is a good idea to summarize in a book the available information together with original unpublished data on the species diversity, chorology, and ecology of key groups of animals, and an overview of significant plant areas in the 470 km long Bulgarian–Romanian section of the Danube. The goal of the book is not to compile a complete list of the fauna and flora of the selected sector, which is not possible due to the poor study of many invertebrate groups in the area.

The initiators of the book preparation and editors are four zoologists from the National Museum of Natural History in Sofia: Assoc. Prof. Peter Shurulinkov, Prof. Zdravko Hubenov, Assoc. Prof. Stoyan Beshkov, and Assoc. Prof. Georgi Popgeorgiev, three of whom are authors and co-authors of chapters in the book. They are experienced experts on important systematic groups of animals and know the study area. The editors have selected a team of 36 authors: 4 botanists and 32 zoologists. The authors are employed at the two most significant biodiversity institutions in Bulgaria, namely the Institute for Biodiversity and Ecosystem Research (15 authors) and the National Museum of Natural History (11 authors), both at the Bulgarian Academy of Sciences, while the other 10 authors represent universities, a museum, a nature park, and NGOs.

The geographical scope of the study area covers the Danube River and its river bank with wetlands and backwaters, as well as the lower courses of its tributaries, i.e. territory up to 10–15 km south of the Danube in Bulgaria (10 chapters). Only two chapters of the book cover a wider area: mammals have been explored in most of the Danubian Plain and Dobrogea, and butterflies, in the entire Danubian Plain and even parts of the Fore-Balkan hilly country.

The systematic coverage of the treated groups includes vascular plants and their habitats, aquatic molluscs, insects with aquatic immature stages, terrestrial Nematocera (Diptera) and Papilionoidea (Lepidoptera), and all vertebrates. The content of the book is divided into 12 chapters on vegetation (1 chapter), invertebrates (5 chapters, 4 of which on insects), and vertebrates (6 chapters, 3 of which on birds).

The flora along the Danube, its islands and river bank is insufficiently explored compared to flora of other areas in Bulgaria and compared to fauna. The chapter on plants is focused on Important Plant Areas (IPAs) in the region. Of all 125 IPAs in this country, 12 sites with an area of 121 km^2 or only 0.86% of the IPAs in Bulgaria are located in the Danubian Plain. Six vascular plants are threatened on European level and need conservation: *Aldrovanda vesiculosa*, *Marsilea quadrifolia*, *Salvinia natans*, *Trapa natans* etc. Eight habitats (5 terrestrial and 3 aquatic), represented in Bulgaria mainly along the Danube, are characterized. The authors propose a new IPA, Kalimok–Brashlen, as well as the IPA Zlatiya to be extended and renamed to Tsibar, and IPA Ostrovska Step to be extended and renamed to Ostrov.

Molluscs have a place in such a book because they are an essential part of the river biocoenosis and are well studied in the area. The Danube and adjacent marshes are

inhabited by 67 species of Mollusca: 47 species of Gastropoda (snails) and 20 species of Bivalvia (mussels). They represent 13% of the species of Mollusca in Bulgaria. Regarding zoogeography, the most numerous are the species with Eurosiberian distribution (26 species or 39%). Regional endemics are *Bithynia danubialis* and *Caspia milae*. Of particular importance are three alien species of Bivalvia, introduced in the Lower Danube over the last 20 years and reaching high numbers throughout the Bulgarian–Romanian section: *Sinanodonta woodiana*, *Dreissena bugensis*, and *Corbicula fluminea*. They are included in the "Black list" of invasive alien species of the Danube River Basin, the latter being one of the 100 worst invasive alien species in Europe. These three species have led to a complete change of the benthic habitats in the surveyed sector of the Danube. The most threatened of the Danube molluscs are *Theodoxus transversalis* (Endangered) and *Unio crassus* (Vulnerable) according to the IUCN Red List.

Insect orders with aquatic immature stages have been investigated to varying degrees in the study area: from very well-studied Ephemeroptera (mayflies) and Odonata (damselflies and dragonflies), and partially explored Trichoptera (caddisflies), to poorly studied Plecoptera (stoneflies). From the Danube and adjacent strip up to 20 km from the river, 52 species of Odonata and Ephemeroptera, at least 46 species of Trichoptera, and 3 species of Plecoptera are reported. On the basis of the original samples, new to the fauna of the area are the family Glossosomatidae (Trichoptera), the genera *Glossosoma*, *Halesus* (Trichoptera), and *Centroptilum* (Ephemeroptera) and 6 species, and many species have been found in new localities. The chapters on these insects contain precise data on the distribution (with maps in Odonata) and the ecology (habitats, and in Odonata plus phenology) of each species. These insect groups are highly vulnerable and due to the anthropogenic impact on the river, the number of species has decreased significantly compared to the middle of the 20th century, and 3 species of Ephemeroptera and all species of Plecoptera are Regionally Extinct in Bulgaria. This affects the entire Danube ecosystem, as some of the extinct species were found in large numbers in the past and formed an essential part of the diet of the bottom fish. The most intense flight period of Odonata is in June. Highly threatened dragonflies at European level are *Cordulegaster insignis* (Endangered) and *Sympetrum depressiusculum* (Vulnerable), the latter being Critically Endangered at national level. The damselfly *Sympecma fusca* hatches in July, overwinters as an adult, and lays eggs in the spring of next year. The first generation of the dragonfly *Hemianax ephippiger* develops in Africa, the adults migrate north, including to the study area (not every year), and here the second generation develops, from which the adults return to Africa.

The less numerous of the two suborders of the insect order Diptera, namely Nematocera, is treated and analysed in the book. The larvae of some families of the suborder live in the water. In general, the suborder is poorly investigated in the study area except for the families Culicidae, Ceratopogonidae, and Chironomidae. So far, 153 species from 14 families or 10% of the species in Bulgaria are known, and it can be expected that the real percentage is 40–50% of the species in this country. The

chapter contains information about the distribution in the area and the range, and even all the literature and distribution in the rest of Bulgaria of each species. The eastern part of the surveyed section of the Danube is better studied. As regards the zoogeography, the species with a Palearctic type of distribution predominate – 51 species or 33% of the species in the area.

Butterflies are not associated with water and are the least studied in the explored area compared to the rest of the country. Therefore, the chapter on the superfamily Papilionoidea (butterflies) of the order Lepidoptera treats the group in the entire Danubian Plain and parts of the Fore-Balkan hilly country or 35% of the territory of Bulgaria. In this area, 153 species occur, i.e. 70% of the species found in this country. A map of distribution in the area is given for each species. *Euphydryas maturna* and *Lopinga achine* have been reported only from this part of Bulgaria. The latter species is most likely extinct. At least half of the Bulgarian populations of *Colias hyale* and *Rubropterus bavius* live in the area.

Fishes are the most significant part of the biocoenosis of a river. In the Bulgarian section of the Danube and the lower courses of its tributaries, 83 fish species occur, 69 of which are native and 12 are alien and introduced. Eight of the native species are endemic to the Danube River Basin. These numbers are the result of a critical review of the literature data and the deletion of some misreported species from the list of Danube fauna. Many of the alien species have been introduced intentionally for rearing in fish ponds. Species that can be expected as alien are also listed. Negative anthropogenic impact affects fish especially strongly. Two of the species in the Danube are Regionally Extinct in Bulgaria: *Acipenser nudiventris* (ship sturgeon) and *Acipenser sturio* (Atlantic sturgeon). Critically Endangered at global level are all species of Acipenseridae (sturgeons) and *Anguilla anguilla* (European eel).

A very accurate picture of the distribution of amphibians and reptiles (with maps for each species) is presented by 10 authors whose original records are several times more than the literature records. With this study, the Danube River and the territories up to 10 km from the river bank are already sufficiently explored. The species diversity consists of 1 salamander, 3 newts, and 11 frogs (a total of 15 species of Amphibia), and 1 turtle, 2 tortoises, 8 lizards, and 8 snakes (a total of 19 species of Reptilia). These are the native species. It is not known whether the invasive turtle *Trachemys scripta* breeds in the area, as it does in other parts of Bulgaria. The herpetofauna of the Bulgarian section of the Danube is slightly richer than that of the Romanian and Serbian sections. Srebarna Lake (30 species or 88% of the species) has the richest species diversity. Most widespread are *Pelophylax ridibundus* from Amphibia and *Lacerta viridis* from Reptilia, and rarest are *Triturus ivanbureschi* from Amphibia and *Mediodactylus kotschyi* complex from Reptilia.

Birds are an integral part of the landscape of a river. They are highly vulnerable to anthropogenic pressure. Therefore, the three chapters on birds are focused on their numbers and trends compared to previous periods. Information collected from 10 authors and many other contributors has been used. The area is inhabited by 43 species of water birds and 28 species of diurnal birds of prey. In the Bulgarian–Romanian

section of the Danube, 15 colonies of herons, cormorants, spoonbill, and ibis are known. The most numerous are the colonies of Persina Island, Srebarna Lake, and Kalimok fishponds. The species observed with the highest numbers of pairs are the two species of cormorants, *Chlidonias hybrida* (whiskered tern), and *Fulica atra* (coot). A clear trend of increase in numbers has been detected for *Aythya nyroca* (ferruginous duck), *Plegadis falcinellus* (glossy ibis), etc., and a decreasing trend for *Chlidonias niger* (black tern), *Microcarbo pygmaeus* (pigmy cormorant), etc. Among the diurnal birds of prey, 20 species of all 28 nest in the area, and some of them, as well as the rest, have been observed as migrating or hibernating. Among the breeding species important for conservation, the populations of *Buteo rufinus* (long-legged buzzard), *Circaetus gallicus* (short-toed eagle), etc. are with highest abundance. The most numerous in migration are *Circus aeruginosus* (marsh harrier), *Buteo buteo* (common buzzard), *Pernis apivorus* (European honey buzzard) etc. These quantitative data are a good basis for future monitoring investigations.

The study of mammals along the Danube focuses mainly on species richness and territorial distribution of habitat suitability and vulnerability. In the Bulgarian–Romanian section of the Danube and the adjacent areas, 77 species occur: 31 bats, 30 terrestrial small mammals, 13 carnivores, and 3 ungulates. Due to the lack of sufficient data for parts of the territory, distribution models of the species of conservation significance were created according to their suitable habitats. These models make possible to assess the species richness and threats. Zones of high suitability and species richness are forests, wetlands, karst areas, and connecting ecological corridors. Globally vulnerable are *Spermophilus citellus* (European ground squirrel), *Vormela peregusna* (marbled polecat) and 5 bat species.

The Danube, its river bank and adjacent territories are negatively anthropogenically influenced, with wetlands drained in the middle of the last century, with habitats destroyed or heavily modified, with decreasing populations of many species. Although water animals and plants are very sensitive to changes in the ecosystems, the area has retained much of its species diversity.

The book is of interest to professional and amateur zoologists, botanists, hydrobiologists, ecologists, to students, to a broader range of naturalists, as well as those interested in biodiversity conservation. The preparation of the book and its publishing are timely because it summarizes the state of knowledge and indicates the gaps in the accumulated information. Thus, the book on the Lower Danube biodiversity will encourage further studies in this direction.